

Agricultural Business Profile on Apples

This profile has been compiled as a source of information for those who may be considering apple orchards as a commercial venture. The reader is cautioned that the information provided should be considered as a starting point only. It does not substitute for a business plan; a business plan incorporates specific information unique to the investor. The preparation and evaluation of a business plan are critical steps that must be taken before any significant investment is made.

While every effort has been made to ensure the accuracy of the information provided, the reader is further cautioned that information critical to his or her business plan should be verified. Particular attention should be paid to information that may become dated.

Abstract

Apple orchards have been part of Prince Edward Island agriculture for more than 150 years. The industry is enjoying a rebirth with the advent of varieties and rootstock more suited to Island conditions. The current marketing focus is to replace up to three-quarters of the imported apples with Island product. While fresh apples are the principal product, niche opportunities exist for other apple-based products. Apple orchard development requires significant initial capital investment. Once the orchard is in place, the potential is there for good returns to the skilled orchardist.

Background

Apples have been grown on Prince Edward Island for more than 150 years. Commercial production began in the late 1800's. Successful orcharding resulted in high quality Island apples taking top prizes at European fruit exhibits in Paris in 1900 and in Glasgow in 1901. At the turn of the century between 1,600 and 2,000 hectares of orchards were documented in the province.

Orchard production declined from 1910 to 1960 due to disease and pest importation, severe winterkill, poor variety selection, and increased competition from orchards in the milder climate of Nova Scotia's Annapolis Valley. The development of dwarf and semi-dwarf rootstocks suited to Island climatic conditions has resulted in a slow and steady increase in Island apple acreage since 1980.

Apple production in Canada is a significant agricultural endeavour with five provinces producing a total of 442,000 tonnes annually. Ontario is the largest producer with 40% of the total Canadian production. Nova Scotia is the largest apple producer in the Maritimes with more than 2,800 hectares of apple trees. Up to two-thirds of the Nova Scotia production is processed. New

Brunswick has about 400 hectares of apple orchards and is strongly oriented to the fresh market. PEI currently has 48 hectares of apple orchards with the equivalent of 29 hectares in full production. The province's annual production of approximately 450 tonnes represents 0.1% of the total Canadian apple production.

Production

Climate: As far as apple production is concerned, Prince Edward Island is in the same climatic zone as New Brunswick and Quebec. By comparison, Nova Scotia apple production areas have zone similarity with New England. Climatic conditions which may cause winterkill can limit the economic viability of the apple industry in PEI. The recent development of new varieties of hardy dwarf and semi-dwarf rootstocks such as M111 and M26 has helped revitalize commercial apple production in the province. There is some evidence that areas with adequate heat units for corn production are also climatically suitable for apple production¹. Areas in PEI with commercial orchard production tend to be located in areas classified as Zone 2 for corn production in the Maritimes².

Cultural Practices: Trees in commercial orchards are grafted stock. The rootstock portion determines the tree size and influences hardiness. The portion grafted onto the rootstock determines the apple variety.

Apple production, particularly for fresh crop and U-pick marketing, has moved into high density plantings of dwarf rootstock. The industry standard is now at least 750 staked and trained trees per hectare. This has resulted in much higher yields. The downsizing of apple trees has resulted in increased yields per hectare, less spraying and a more efficient use of land and resources. As with any agricultural crop, attention to detail and careful management are keys to success.

Staking and training the tree consists of inserting a pressure-treated 5 centimetre by 5 centimetre stake alongside the tree in the augered hole at the time of planting. The stake should extend a minimum of two and one half metres above ground level. The tree is secured to the stake with either black plastic ties or black plastic lock rings available from orchard supply outlets. The tree is attached at approximately one metre above ground initially. As it grows, the central leader is attached to the stake to hold it upright. The objective is to get the leader upright to approximately three metres in height and then allow it to droop over to limit further height development.

Using intensive management techniques, the time from planting to full harvest can be decreased. While it is possible to harvest a small quantity of apples three years after planting, full harvest can be expected five to seven years after planting. The average productive life for an intensively managed dwarf-rootstock orchard in Atlantic Canada is thirty-five years.

Yields from semi-dwarf rootstock varieties average 750 bushels (14,300 kilograms) per hectare. With high-density planting, yields of 1500 bushels (28,600 kilograms) can be achieved. However, input costs to achieve these yields are higher.

Canadian cultural practices, in general, and PEI cultural practices, in particular, are well behind trends in Europe and four to five years behind trends in the USA. In addition to downsizing and intensive planting, trends have been toward such practices as sod growth in orchards and training trees to handle snow load in areas of heavy snowfall.

Season length limits the number of commercial apple varieties suited to Prince Edward Island. McIntosh, Cortland, Spartan, and Paula Red are favoured varieties. However, research has identified several new and exciting varieties which have potential.

Outputs: Fresh apples are the principal product marketed from apple orchards on Prince Edward Island. However, there is some potential for small scale juice, cider, and other niche products.

Land Requirements: Orchards require the best land available. On Prince Edward Island, dry, well-drained soils of the Charlottetown or Alberry series are preferred. Suitable orchard sites have an adequate layer of topsoil, good organic matter levels, are gently sloped to encourage frost drainage, and are sheltered to the North. South-facing slopes are preferable. Land suitable for orchard production tends to be the most expensive farmland in the province, with 1998 prices in the range of \$6,250 to \$8,750 per hectare.

Fertility: To be successful, intensive management requires a long-term, multi-year program of soil building and soil maintenance. To develop such a program, the orchardist must have a high level of knowledge in soil fertility and orchard production.

Regular soil and leaf sampling to monitor fertility is an essential component of a fertility program. A combination of granular and foliar applications of nutrients is key to building and maintaining orchard fertility. In addition to maintaining optimum nitrogen, phosphorus, potash and calcium levels, special attention should be paid to the micro-nutrients boron and zinc which aid fertility and promote winter survival.

Pests and Diseases: Scab, a fungal infection which is more prevalent in wet or humid conditions, is the number one disease problem in Island orchards. Fire blight, another common fungal disease, is almost nonexistent in PEI.

Anthraco-nose canker and European canker occur in orchards throughout the Maritimes, and PEI is no exception. Practising good orchard sanitation and ensuring that only canker-free trees are brought into the orchard can limit and/or control these diseases.

Common insect pests in Island orchards include leaf rollers, codling moths, apple maggots and aphids. Information on control measures for these pests is available in the *Atlantic Orchard Management Schedule* prepared by the Atlantic Committee on Fruit Crops.

Young trees may be damaged by mice and rabbits chewing the tender bark on the trunk and lower branches. Complete girdling may result in the loss of the tree. To minimize the damage, a wrap should be placed around the tree trunk at planting.

A well developed Integrated Pest Management (IPM) program is key to effective disease and pest control in orchards. Successful IPM programs include regular monitoring to determine the levels of insect and disease pressure and taking corrective measures only when potentially harmful levels are reached. IPM allows a healthy orchard to withstand low levels of pest infestations. Selective spraying and accurate timing of treatments can effectively control scab and other pest problems.

Harvesting Practices: Because mechanization has not proved practical to date, apples are hand picked at harvest. Apples are harvested, put in bins, and graded. The bins are then placed in cold storage. Pick-your-own harvesting, or U-pick, is a common harvest practice in orchards less than four hectares.

Specialized Equipment: Apple production requires a number of specialized pieces of equipment. Compact tractors with relatively high horsepower (60 HP range) are required to operate specialized equipment such as orchard mist sprayers, orchard mowers, herbicide sprayers, and pruning equipment. Fertilizer spreaders of a standard design can be used in orchards if they can be finely calibrated.

The specialized equipment required is available from manufacturers in many North American and European locations. Good used equipment is available in places, such as Ontario, where there is a concentration of apple production. A list of equipment required is presented in Table 2.

Marketing

Fresh Apples: The acreage of apple orchards in PEI has doubled over the last six years. Based on recent plantings, it is anticipated that production will double again within three years. To date, marketing has been individual and, for the most part, U-Pick oriented.

The Prince Edward Island Commercial Apple Growers' Association has embarked on a program to develop an orderly approach to getting Island product on store shelves. The primary marketing focus for Island apple growers is import replacement. Based on the annual PEI apple consumption of 80,000 bushels (1.54 million kilograms), the 1998 acreage has the capacity to supply 20% of the market. A long-term goal of the PEI Commercial Apple Growers' Association is to capture at least 75% of the total provincial consumption. In the longer term, consideration is being given to developing well-adapted, high-value apple varieties for the specialty offshore market.

The market for apples is highly competitive and is becoming increasingly global, particularly for off-season and unique varieties. The major sources of competition for PEI producers are Nova Scotia, New Brunswick and Quebec. As well, Ontario, British Columbia and the USA move significant quantities into the PEI marketplace in periods when product is not available locally and when specific varieties cannot be supplied locally.

The challenges for the PEI apple industry are to increase the industry's ability to fill market requirements over a longer term and with a wider variety of high quality product and to develop a strong identity in the marketplace for PEI produced apples.

Other Products: Niche-market opportunities exist for cider, preserves and other small scale processed apple products. There are two commercial cider pressing operations in the province operated in conjunction with U-Pick orchards. Cider and other processed products provide the orchardist with the opportunity to make use of off-type apples in an effective and high-value way. Niche market products allow the orchardist to market in the off-season and to develop a presence in the agri-tourism marketplace.

Marketing Considerations: Those who are considering developing an apple orchard must be prepared to spend significant time researching the market and planning where to concentrate efforts for the best economic return.

Marketing activities could include:

- Getting involved with the marketing activities of the PEI Commercial Apple Growers' Association
- Making contacts with wholesalers and processors
- Investigating consumer demands
- Investigating marketing options
- Developing a marketing plan
- Developing an agri-tourism component

Processing

Other than for small-scale niche markets, there is limited opportunity for processing apples on PEI. Nova Scotia has a major apple processing industry with over two-thirds of the total production grown for the processing market. Cultural techniques used for the production of apples for processing are significantly different from those used for apples destined for the fresh market. Due to global competition, the price for apples used for processing has decreased to levels which make economic viability questionable.

Processing for niche and specialty markets is one way to add value to seconds, off-type, or surplus fresh apples. Fresh apple cider is the most commonly processed apple product. Making fresh apple cider is a simple process. The apples are crushed and pressed to separate the juice from the pulp. The juice is then strained and bottled. Cider not sold within one or two days of squeezing must be preserved. Freezing is the most commonly employed technique. Commercial cider-pressing equipment is available from a number of supply houses. However, the simplicity of the process allows for the inexpensive development of homemade equipment. Standard cooling and freezing equipment is employed in preserving.

The federal government recently developed a Code of Practice for the Production and Distribution of Unpasteurized Apple Cider.³ It is likely that regulations requiring the pasteurization of all apple cider offered for sale will come into effect in the near future. This regulation could result in extra costs for processing which might affect the economic viability of processing cider. Pasteurizing equipment suitable for small scale cider production presently retails for approximately \$21,000. Should ultraviolet treatment prove acceptable, equipment could be obtained for approximately \$12,000.

Opportunities exist for marketing value-added apple products such as apple preserves, apple butters and apple chutneys. Hard apple cider, apple wine and other apple-based alcoholic beverages offer development opportunities as well, particularly in light of changing regulations regarding estate vinting and brewing on PEI.

Human Resource Requirements

Today's orchardist requires specialized background or training. Start-up investment is high and margins are too narrow to allow for a learn-as-you-go approach. The orchardist needs to be intimately familiar with all the modern concepts and techniques of fruit production. Technical training is available from a number of sources. The Nova Scotia Agricultural College in Truro, Nova Scotia, offers programs in orchard management and the University of Guelph, Guelph, Ontario, offers a number of correspondence courses in orchard management and production.

Orchards of up to 14 hectares can be managed by one person with seasonal help during harvest and storage. Labour skills needed for the harvest are the ability to work quickly and efficiently in a physically demanding job. Orchard labourers should have general farm knowledge and experience;

experience operating trucks, tractors and farm equipment; maintenance and repair skills; and a willingness to work flexible hours. The availability of labourers could be a problem. Apple harvest requires a large number of workers for a short but critical period of time when seasonal labour is in high demand. Typical wage rates for this type of labour are in the \$6 to \$8 per hour range.

In addition to base pay, labour costs include the employer's contributions to Canada Pension Plan (CPP) and Employment Insurance (EI). Participation in the Worker Compensation Plan (WCP) is optional for workers involved in primary production. An employer should consider WCP coverage. The cost for fruit and vegetable farm workers under WCP is currently \$3.78 per \$100 of payroll.

The standard management skills necessary in all small businesses are needed by the orchardist. For further information on this topic see CFBMC Canadian Framework for Effective Farm Business Management Practices, available from the Canadian Farm Business Management Council.

Regulatory Issues

Canada Agricultural Products Act - Anyone wishing to market fresh produce interprovincially or internationally must be in compliance with this federal Act with respect to grades and standards and with respect to import and interprovincial trade.

Pesticides Control Act - Anyone wishing to buy and/or apply any pesticides with the exception of domestically labelled products, must be certified under this Act.

Environmental Protection Act - Anyone wishing to draw water from a watercourse or well must have a permit under this Act. If a stream crossing is required to access a property, a permit must be obtained under this Act.

Roads Act - Anyone who intends to install a new highway access (or change an existing access) requires a permit under this Act.

Canada Food and Drug Act - Anyone selling apples, or other orchard products, should be concerned with this Federal Act with respect to agricultural chemical residues, food additives, labelling and processing.

Occupational Health and Safety Act - At the present time, farming operations which are located on property that qualifies for a farm assessment under the *Real Property Assessment Act* are not subject to the requirements of the Occupational Health and Safety Act and Regulations. However,

the Act and Regulations can provide excellent guidance on worker health and safety issues.

Environment

From an environmental point of view, apple production has both a positive and a negative image. On the positive side, apples are considered a healthy food. Orchards are maintained in sod and are not subject to any significant erosion or soil degradation. On the other hand, environmental questions are being raised about past orchard management practices. IPM practices can minimize adverse environmental effects in orchard production.

Development Costs

Development costs include the cost of land, land improvements, buildings, equipment, machinery, and licenses. Initial per hectare costs for developing an apple orchard are high. The best quality land available in the province is required for apple production; thus, it may be in direct competition with potato production. If apple production is a secondary enterprise to an established farm, much of the equipment and land costs can be shared with other enterprises. However, a significant amount of specialized equipment and machinery is required.

Two hectares is considered a minimum size when starting a commercial apple operation. For an enterprise to become economically viable, the orchardist starting out with this minimum size should consider at least doubling the orchard size within the first few years of starting production.

Table 1 presents the start-up costs on a per-hectare basis for establishing an apple orchard. Costs are based on dwarf rootstock and a stocking rate of 750 trees per hectare.

Table 2 lists the minimum requirements for machinery and buildings. Machinery costs are based on used equipment in good condition. For information purposes, new equipment costs are also listed. A building for storage, packing and other orchard requirements is presented as an option since it is not required initially. Should the orchardist plan on only a small acreage of U-Pick, this building may not be required. However, any move toward marketing into wholesale or retail channels will require some storage and packing capability.

Table 1

Orchard Establishment (dwarf rootstock trees, 750 trees/ha)	
Land	\$ 7,500
Land Preparation	\$ 375
Drilling planting holes	\$ 450
Trees (750 @ \$7)	\$ 5,250
Stakes (750 @ \$7)	\$ 5,250
Planting	\$ 350
Total Cost	\$19,175

Table 2 - Development Costs, Machinery and Buildings used and new equipment

	Used	New
Tractor (60 HP)	\$ 12,000	\$ 49,500
Orchard Mist Sprayer	\$ 6,000	\$ 10,000
Mower	\$ 2,500	\$ 4,500
Herbicide Applicator	\$ 2,000	\$ 3,500
Wagon	\$ 1,500	\$ 2,500
Water tank & Wagon	\$ 2,500	\$ 3,000
Pallet Jack	\$ 400	\$ 600
Bin Piler	\$ 3,000	\$ 5,000
Misc. Handling Equipment	\$ 3,000	\$ 3,000
Bins (70 @ \$50)	\$ 3,500	\$ 3,500
Total Machinery & Equipment	\$ 36,400	\$ 85,100
Cold Storage & Packing Building (20' x 40') (Optional)		\$ 30,000
Total Building & Storage		\$ 30,000

Table 3

Orchard Establishment (Years to Full Production)						
	Year 1 planting	Year 2 growing	Year 3 1st crop	Year 4 2nd crop	Year 5 3rd crop	Year 6 full production
Income (\$/ha)						
Yield (kg/ha)	0	0	1,025	2,725	15,250	20,500
Price (\$/kg)			\$ 1.00	\$ 1.00	\$ 1.00	\$ 1.00
Total income	\$ 0	\$ 0	\$ 1,025	\$ 2,725	\$ 15,250	\$ 20,500
Direct Expenses (\$/ha)						
Land preparation	825	-	-	-	-	-
Trees and stakes	10,500	-	-	-	-	-
Planting	350	-	-	-	-	-
Herbicide (2 applications @\$400)	800	800	800	800	800	800
Mowing (4 times @ \$150)	600	600	600	600	600	600
Pruning (12.5 hrs @ \$10)	125	125	125	125	125	125
Training (12.5 hrs @ \$10)	125	125	125	125	125	125
Wrap, wrapping (7.5 hrs @ \$10)	505	-	-	505	-	-
Fertilizer	60	120	240	360	480	480
Fungicide and application	0	120	675	975	975	975
Harvest @ \$0.10/kg	0	0	102	272	1,525	2,050
Total Expense	\$13,890	\$ 1,890	\$ 2,667	\$ 3,762	\$ 4,630	\$ 5,155
Contribution margin	(\$13,890)	(\$1,890)	(\$1,642)	(\$1,037)	\$10,620	\$15,345

This budget is provided as a guide only. Prospective orchardists must develop their own business plan. The **contribution margin** must provide funds for interest, overhead, and other indirect expenses as well as for living expenses, loan repayments and future investment in the business. In this budget a negative **contribution margin** (indicated in brackets) identifies a need for additional income or financing during the establishment period.

Key Management Issues⁴

If you continue to investigate this agricultural business opportunity, it is essential that you are able to answer the following questions concerning production, marketing, and management:

Planning: Are you prepared to develop a complete business plan for an apple enterprise and to test this plan on a scale that you can afford?

Knowledge: Are you prepared to learn all you can about apple production by attending training sessions, working with an established orchardist, visiting other orchards, and reading all you can about apple production and marketing?

Markets: Have you clearly defined the market(s) and the clients for your products and services? Have you clearly defined the marketing activities for each specific market segment?

Production: Have you clearly defined the production practices you will need to implement in order to produce the quality of product demanded by your markets?

Time: Are you aware of the amount of time you will have to devote to marketing your products and services and improving your production performance?

Costs: Are you aware of the resources required to establish an apple orchard and the returns that can be expected?

Risk: Are you prepared to take the risks associated with orcharding and apple production?

Resources

Prince Edward Island Commercial Apple Growers' Association

c/o Barry Balsom,
Arlington Orchards
RR2 Richmond, PEI C0B 1Y0
902-831-2965

PEI Department of Agriculture and Forestry

Agriculture Resources Team
Charlottetown Research Centre
440 University Avenue
Charlottetown, PEI C1A 7N3
1-800-959-8929

Farm Business Management
Charlottetown Research Centre
440 University Avenue
Charlottetown, PEI C1A 7N3
902-368-5655

Enterprise PEI

Development Division
25 University Avenue
PO Box 910
Charlottetown, PEI C1A 7L9
902-368-6301

Trade Development Centre
2nd Floor, 75 Fitzroy Street
Charlottetown, PEI C1A 1R6
902-368-0050

Prince Edward Island Food Technology Centre

101 Belvedere Avenue
PO Box 2000
Charlottetown, PEI C1A 7N8
902-368-5548

Canada/Prince Edward Island Business Services Centre

75 Fitzroy Street
PO Box 40
Charlottetown, PEI C1A 7K2
1-800-668-1010

Atlantic Canada Opportunities Agency - PEI

100 Sydney Street
PO Box 40
Charlottetown, PEI C1A 7K2
1-800-871-2596

Agriculture and Agri-Food Canada

Market and Industry Services Branch
440 University Avenue
PO Box 2949
Charlottetown, PEI C1A 4N6
902-566-7300

National Research Council

20 Watts Avenue
West Royalty Industrial Mall
Charlottetown, PEI
902-566-7640

Business Planning for Agricultural Ventures

1-888-322-2728
Local contact: Beaton Fitzpatrick Murray
Chartered Accountants
902-892-5365

Business Development Bank of Canada

BDC Place
111 Kent Street
PO Box 488
Charlottetown, PEI C1A 7L1
902-566-7454

Endnotes

1. Brown D.M. Rating Climate in Southwestern Ontario for Horticultural Crops. 1990.
2. Atlantic Provinces Agricultural Services Co-ordinating Committee. Atlantic Corn Guide - 1999. Publication 100C, Agdex No. 100.32.
3. Canadian Food Inspection Agency, Code of Practice for Unpasteurized Apple and other Fruit Juice/Cider Production and Sale Website. <http://www.cfia-acia.agr.ca/english/plant/processed/code-end.html>
4. Alberta. Agriculture, Adapted from *AG-Ventures Agricultural Business Profiles*

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Modern Fruit Science, Orchard & Small Fruit Culture. 1983. Childers, Norman F. Horticultural Publications, Gainesville, Florida. ISBN 0-938378-01-5. 581 pp.

Postharvest Technology of Horticultural Crops, 2nd Edition. 1992. Ed: Adel A. Kader. University of California, Division of Agriculture and Natural Resources. Publication #3311. ISBN 0-931876-99-0. 296 pp.

Revisiting Eden, An Industry Reborn: A Strategy and Action Plan for the Commercial Apple Growers of Prince Edward Island. 1998. Pinsent, Morley E. The Prince Edward Island Commercial Apple Growers' Association. 22 pp.

Tree Fruit Production. 1982. Teskey, Benjamin and James S. Shoemaker. AVI Publishing, Westport, Connecticut. ISBN 0-87055-265-1. 409 pp.

Periodicals

American Fruit Grower. Meister Publishing Company, 37733 Euclid Ave. Willoughby, Ohio 44094

Canadian Fruit Grower. Annex Publishing and Printing Inc. 222 Argyle Ave. Delhi, Ontario N4B 2Y2

Good Fruit Grower. Washington State Fruit Commission. 105 South 18th St., Suite 217, Yakima, Washington 98901-2149

Internet Sites

<http://www.cfia-acia.agr.ca/english/plant/processed/code-eng.html> *Canadian Food Inspection Agency Code of Practice for Unpasteurized Apple and other Fruit Juice/Cider Production and Sale*

<http://agri.gov.ns.ca/pt/hort/newslets/orchard/> *Nova Scotia's Monthly (seasonally biweekly) Orchard Producers Newsletter*

<http://www.gov.on.ca/OMAFRA/english/crops/othernws.html> *Access to a wide range of Apple Orchard Newsletters and Information sources*

<http://aceis.agr.ca/misb/hort/enfruits.html> *An Overview of the Canadian Fruit Situation and Trends*

http://www.cfbmc.com/eng/body_index.html *CFBMC Canadian Framework for Effective Farm Council*